Chapter 2 - Alternatives Considered

What is in Chapter 2?

Based on the purpose, need and project goals established for the project in Chapter 1, Chapter 2 details the process utilized to develop a range of reasonable alternatives subject to further analysis in Chapter 3. Several improvement concepts were initially developed and eliminated in this chapter because they were determined to be unreasonable or did not satisfy the purpose and need for the project.

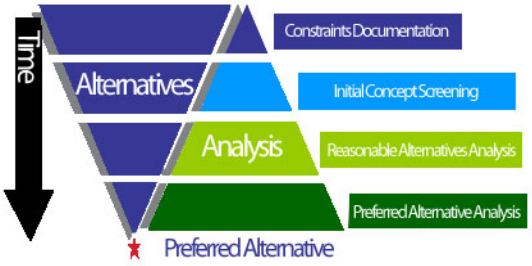
How did the alternatives development and screening process work?

The study team followed the process illustrated in Figure 2-1. That process first identified a wide range of initial alternatives and screened those concepts based on criteria related to meeting the purpose and need. From that initial screening of alternatives, a set of "reasonable" alternatives were developed and subjected to a more stringent set of criteria (Chapter 3).

The Whitton Expressway study process included these steps:

- The alternatives start as preliminary concepts
- Initial screening identifies those concepts with major concerns
- Concepts that seem reasonable are developed more fully as alternatives
- More varied and stringent criteria are used as the alternatives become more developed

Figure 2-1: Whitton Alternative Development and Screening Process



Alternatives become more developed and screening becomes more stringent during the study process.

The process concluded with the study team using another round of screening to identify a Preferred Alternative. The study team identified a Preferred Alternative after comparing each alternative's ability to meet the project's purpose and need and assessing any unavoidable impacts to both the natural and social environments.

Throughout this process, the study team collaborated with the public and resource agencies at each stage of development and screening. One of the comments heard during the initial public meeting was that it was important to the public to look at bypasses of the existing Whitton Expressway corridor. Bypasses were then considered as part of the initial alternatives.

What initial alternatives did the study team consider?

The initial alternatives consisted of a wide range of improvement concepts for the Whitton Expressway corridor, including several concepts developed during the Problem Definition Study. The initial alternatives focused on concepts consistent with the project purpose and need.

The initial alternatives considered by the study team included the following:

No-Build Alternative

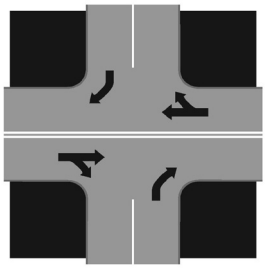
Traditionally, the environmental decision-making process includes a No-Build alternative to create a baseline for comparing and identifying the merits of all concepts evaluated. The No-Build Alternative is not a no-cost concept—it includes maintenance and repair of the existing roadway. Whitton Expressway would remain in its present configuration and location and no improvements would be made to access the prison redevelopment site.

Transportation System Management

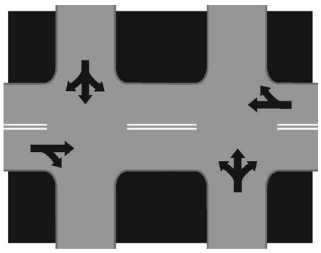
Transportation System Management measures generally include low-cost, traffic flow improvements to manage traffic congestion and improve the transportation system's efficiency. The different types of system management improvements considered for the Whitton Expressway included:

- Right-In/Right-Outs – This strategy included prohibiting access across Whitton Expressway in the north-south direction and only allowing what is referred to as right-in/right-out turns along Whitton Expressway to and from Jefferson, Madison and Monroe.
- Eliminate Left Turns Onto Whitton – This strategy would prohibit left turns from Jefferson, Madison or Monroe onto Whitton Expressway. This strategy would still allow left turns from Whitton onto Jefferson, Madison or Monroe.
- One-way Pair(s) – The strategy would utilize Jefferson and Monroe as a pair of one-way streets to move traffic efficiently in the north and south directions.
- Intersection Improvements – Minor intersection improvements could improve operating efficiency, including realigning intersections, adding or improving existing traffic signal systems, or providing signal connections to improve traffic flow through several intersections.
- Intelligent Transportation Systems (ITS) – ITS improvements consist of technology-based systems used to improve safety and more efficiently manage the transportation system. In the realm of roadway operations, ITS focuses on improving traffic flow through enhanced traveler information, minimizing the impact of incidents through incident management and regulating traffic flow. Activities can include traffic sensors,

Right-In/Right-Outs



One-Way Pairs



Intelligent Transportation Systems

Variable Message Signs, such as the one pictured here are a common feature of ITS improvements.

closed-circuit television cameras, variable message signs, web pages, ramp metering, communication links for public safety, and media communication.

Travel Demand Management (Transit)

Travel demand management measures employ services that are designed to reduce congestion on existing transportation infrastructure by encouraging commuters or employers to use modes other than single occupant vehicles, alter time and location of trips (flexible work hours), support ridesharing or support increased transit use.

Build Alternatives

Several build alternatives were developed during the course of the study. For simplicity in evaluating the numerous alternatives that were developed, the study area was divided into two primary sections. The first section included the western half of the study area from Bolivar, through the five intersections at Missouri Boulevard, Broadway, Jefferson, Madison, and Monroe ending at the Jackson overpass. The second section included the eastern half of the study area starting at the Jackson overpass and ending at the Eastland interchange. The eastern half does not include improvements to the mainline configuration of Whitton Expressway except where changes are necessitated by improved or additional interchanges. The character of Whitton Expressway changes to a freeway-type facility at the Jackson overpass. As noted in Chapters 1 and 3, this segment of Whitton Expressway operates at an acceptable level of service with a crash rate similar to the statewide average. Since traffic forecasts anticipate operation at acceptable levels of service, improvements to capacity

Table 2-1: Build Concepts

Alternative Concept	Description
Western Segment – Whitton Mainline	
Build Concept 1 (North Bypass)	• Initially developed to address the need to split, long-distance traffic that is traveling through Jefferson City on US 63 from local traffic that currently utilizes Whitton. • Would follow Highway 94 north of the Missouri River from the existing US 63/US 54 interchange to a point east of Jefferson City. It would then turn south crossing the Missouri River and reconnecting with existing US 63/50 east of town. • This would be a four-lane bypass with an approximate length of 22 miles.
Build Concept 2 (South Bypass)	• Similar to the north bypass, this alternative would start near the existing US 63/54 interchange north of the Missouri River, head southwest crossing the river before intersecting with the existing US 50/Highway 179 interchange west of downtown. It would utilize existing Highway 179 to Highway 50 south of town and then a new highway would be built around the southeast part of town reconnecting with US 50/63 east of town. • This would be a four-lane bypass with an approximate length of 31 miles.
Build Concept 3 (Max Lanes) *	• This alternative was developed to satisfy all the long-term traffic operation needs identified in this segment, utilizing the existing configuration of signalized intersections. • Includes a ten to twelve lane roadway, with significant improvements at each of the existing intersections.
Build Concept 4 (Viaduct) *	• Provides for an elevated viaduct starting just east of Broadway and extending over the three intersections at Jefferson, Madison and Monroe, coming back down to the existing roadway near the Jackson overpass. • Includes additional intersection improvements at Missouri Boulevard and Broadway. • Local access would be provided under the viaduct at the three existing intersections.
Build Concept 5 (Parkway)	• The parkway concept was developed to provide maximum flexibility in its implementation. • The first phase would include widening the existing roadway to provide a parkway facility with a wide median between Broadway and Monroe, including additional left-turn storage. • The second phase, as traffic dictated, would be to replace the wide median with an elevated roadway segment from east of Broadway to west of Jackson.
Build Concept 6 (Madison Overpass)	• This alternative would construct a north-south overpass at Madison to improve accessibility to the south. • Access to and from Madison from Whitton would be eliminated thereby improving the operations of the remaining intersections at Jefferson and Monroe. • Improvements to Jefferson and Monroe would be required to handle the additional traffic. • Consists of three lanes of traffic in each direction & two center turn lanes.

* Alternative originally identified in the Whitton Problem Definition Study

Table 2-1: Build Concepts, continued

Concept	Description
Eastern Segment - Prison Redevelopment Site Access	
Build Concept A (Lafayette)	• Builds a new full diamond interchange at Lafayette and Whitton to provide a new access to the prison redevelopment site, Lincoln University and JCHS. • Requires improvements to Lafayette from Whitton to the prison, consisting of a four or five-lane (two lanes of traffic in each direction with a center turn lane) arterial type roadway. • Includes new roundabouts at the Clark interchange ramp intersections.
Build Concept B (Lafayette and Chestnut)	• Provides two primary access points to the prison redevelopment; one along Lafayette and one along Chestnut. • Provides improved access to Lincoln University and JCHS. • Each street would be two-lanes, operating as one-way pairs, with Lafayette running southbound and Chestnut northbound. • A new interchange would be constructed at Lafayette with service roads provided on the north and south sides of the expressway connecting Lafayette and Clark. • Includes new roundabouts at the Clark interchange ramp intersections.
Build Concept C (Clark Realignment)	• Provides access to prison from the existing Clark Avenue interchange by extending existing Clark from McCarty to the prison. • Includes new roundabouts at the interchange ramp intersections. • Consists of two lanes of traffic in each direction with a center turn lane (five lanes total). • Realigns Clark Avenue to connect to Olive Street and then directly into the prison site.
Build Concept D (Lafayette Interchange and Clark Realignment)	• To eliminate the need to widen Lafayette from Whitton to the prison, a modified alternative was developed that provided a new interchange at Lafayette and provided an extension of Clark from McCarty into the eastern side of the prison redevelopment. • Provides improved access to Lincoln University and JCHS. • Splitting the traffic between the two access points would mitigate the need to widen Lafayette north of Whitton and reduce the total footprint (from five-lanes to three-lanes) on the Clark Realignment. • Includes new roundabouts at the Clark interchange ramp intersections. • This alternative could also be staged based on how quickly the redevelopment of the prison progresses.
Build Concept E (Clark One-Way Pair)	• This concept was developed as an alternative to the Clark Realignment where the northbound and southbound movements on Clark are separated. • Northbound traffic follows Clark Avenue to Dawson Street and southbound traffic connects with Olive Street and then follows southeasterly to Clark Avenue. • Includes new roundabouts at the Clark interchange ramp intersections.
Build Concept F (Eastland)	• Provides prison site access from Whitton at the existing Eastland Drive interchange • Consists of a new five-lane, arterial roadway (two lanes of traffic in each direction with a center turn lane) • Travels northwesterly from Eastland Drive interchange to intersect with Hough Street, follows Hough to Riverside Drive and then heads southwest on Riverside Drive to access the prison.

and traffic safety were not identified as needs for this segment. The improvements in this section focused on access to the MSP site and other activity centers. It also includes various north-south street alternatives to improve that access.

The study team considered six Whitton Expressway mainline alternatives on the western section and six prison access alternatives for the eastern section. Each of the western build alternatives could work with any of the eastern build alternatives and the same in reverse. **Table 2-1** describes, and **Exhibit 2-2** displays, each alternative and the Initial Screening Report in **Appendix B** discuss each alternative concept in more detail.

How did the initial alternative concepts become reasonable alternatives?

The study team completed a preliminary screening of the initial alternatives by evaluating the relative effectiveness of each concept. The first step in the screening involved an evaluation of how well each concept addressed the purpose and need for the project. If an initial improvement alternative did not meet the purpose and need of the project, the study team would not consider it further as a reasonable alternative.

The second step involved using other criteria incorporated from social, environmental and engineering factors, as well as input from the community. These other criteria included generalized potential impacts to the built environment, natural areas, social environment and architectural and archaeological properties, as well as an initial estimate of project costs.

Alternatives that appeared to meet the purpose and need for the project and had no obvious extraordinary impacts that the study team could not resolve, advanced to the next round of more detailed development and screening within the alternatives analysis. **Exhibit 2-1** displays the results of the alternative concept screening.

Which initial alternatives were eliminated?

Based on a comprehensive review of the initial alternatives, the study team eliminated the following from further consideration.

No-Build Alternative

The No-Build alternative did not meet the purpose and need for the project and the study team eliminated it from consideration. More specifically, it did not address the need for additional capacity nor did it improve accessibility to the prison redevelopment site.

The study team carried the No-Build alternative forward to serve as a baseline from which to compare all the reasonable alternatives.

Transportation System Management

By itself, the transportation system management alternative did not satisfy the purpose and need for the project. It did not provide a significant improvement in operations, and could not improve access to the prison. The study team eliminated it from further consideration as a stand-alone concept.

Because these concepts could be incorporated into other improvement concepts, such as the Madison Overpass concept, they were carried forward to enhance the ability of other alternatives to meet purpose and need.

Screening Initial Alternatives

When selecting initial alternatives to develop further as reasonable alternatives, the study team chose those that best met elements of the Purpose and Need, including:

- Roadway capacity and traffic operations – the ability to handle high traffic volumes and congestion, especially during peak period.
- Traffic safety – reduce the number and severity of crashes on Whitton.
- Address structural and roadway needs – using engineering to reduce the opportunities for head-on crashes and room for recovery or avoidance of obstacles;
- Improve access to the Missouri State Penitentiary and Encourage Development
- Improve access to Lincoln University and Jefferson City High School.

Key Finding

The study team eliminated the following initial alternative concepts from consideration:
No-Build
Transportation System Management
Travel Demand Management
Concept 1 (North Bypass)
Concept 2 (South Bypass)
Concept 3 (Max Lanes)
Concept B (Lafayette & Chestnut)
Concept E (Clark 1-way Pair)
Concept F (Eastland)

Travel Demand Management (Transit)

The travel demand management concepts, by themselves, did not satisfy the purpose and need for the project. They did not provide a significant improvement in operations and could not improve access to the prison and were, therefore, eliminated from further consideration as a stand-alone concept.

Because these concepts could be incorporated into other improvement concepts they were carried forward as potential enhancement strategies.

Western Segment – Mainline Concepts

The study team eliminated three mainline initial alternative concepts from further consideration:

- Concept 1 North Bypass and Concept 2 South Bypass – Both the north and south bypass alternatives were eliminated from consideration because neither met the purpose and need for the project. While the two bypass alternatives, especially the north bypass, resulted in some long-distance, through trips diverting away from the Whitton Expressway corridor, the total number of diversions were not sufficient to improve the overall operations of the expressway. In addition, these alternative concepts did not provide improved accessibility to the prison redevelopment site. These alternatives do have merit as the community continues to grow but were not sufficient to satisfy the specific needs of this project.
- Concept 3 Max Lanes – Concept 3 was eliminated from further consideration even though it met the purpose and need for the project. Offsetting the benefits in traffic operations was the large footprint required that would result in impacts to businesses properties, their access or parking. Another issues was the inability to efficiently and safely transition through the tri-level interchange, the potential impact to side road connections and the impacts to the Wears Creek streambed.

Eastern Segment – Prison Access Concepts

The study team also eliminated four of the prison access alternative concepts from further consideration, including Concept B, C, E and F:

- Concept B Lafayette & Chestnut – Concept B was eliminated due to a number of property impacts, significant terrain challenges, and the potential for cemetery impacts along Chestnut Street. The connections between Lafayette and Clark also created additional property impacts, including significant impacts to East Miller Park.
- Concept C Clark Realignment – Concept C was eliminated because it did not meet the purpose and need for the project. The alternative did not provide access to Lincoln University or Jefferson City High School from Whitton and would provide a less desirable entrance into the MSP site. This concept would require changing Clark to a four lane arterial and realigning the existing street creating additional property impacts.

- Concept E Clark One-Way Pair – Concept E was eliminated because it did not meet the purpose and need for the project. In addition, steep grades would be required for the northbound leg of the Clark extension and splitting the northbound and southbound legs of this extension creates neighborhood impacts. Finally, the configuration would require additional improvements on the north side of the Clark interchange with Whitton Expressway and require the elimination of access to Miller.
- Concept F Eastland – Concept F was eliminated because it did not meet the purpose and need for the project. This alternative requires travelers to drive a long distance out of their way and the indirect access to the prison redevelopment site wouldn't draw enough traffic to meet the needs of the project. The variation in the elevation of the land would cause engineering difficulties because it would be difficult to keep the steepness of the roadway reasonable and consistent. The alternative would require a large number of property acquisitions along Hough Street and Riverside Drive. Lastly, this concept would not have provided access to Lincoln University and Jefferson City High School from Whitton.

Key Finding

The following initial alternative concepts advanced in the study as reasonable alternatives:
Concept 4 (Viaduct)
Concept 5 (Parkway)
Concept 6 (Madison Overpass)
Concept A (Lafayette)
Concept C (Clark Realignment)
Concept D (Lafayette and Clark)

Which concepts advanced in the study as alternatives?

Based on each alternative's ability to meet purpose and need and other key criteria, the study team chose the following initial alternative concepts for further development as reasonable alternatives.

- Western Segment – Mainline Alternatives
  - Concept 4 (Viaduct)
  - Concept 5 (Parkway)
  - Concept 6 (Madison Overpass)
- Eastern Segment – Prison Access Alternatives
  - Concept A (Lafayette)
  - Concept D (Lafayette Half Interchange and Clark)

Exhibit 2-1 displays the results of the initial alternative screening. The rationale for selecting the above-mentioned initial alternative concepts to advance as reasonable alternatives is provided in more detail below.

Western Segment – Mainline Alternatives

The study team selected to advance three mainline initial alternative concepts as reasonable alternatives.

- Concept 4 (Viaduct) – This alternative satisfied the purpose and need for the project by addressing the needs for capacity and improvement of traffic operations, as well as the addition of safety features. The overall footprint was less than other alternatives and resulted in minimal impacts to Wears Creek. The height of the viaduct will allow for

16 feet 6 inches of clearance. The cost of constructing this alternative is estimated at $32 to 36 million.

- Concept 5 (Parkway) – This alternative would allow for the accommodation of future traffic by allowing for an elevated section in what would be a median in the short-term. This alternative provides important flexibility to make improvements when the need arises in the future without committing all the required resources initially. The cost of constructing this alternative is estimated at $18 to 21 million. The Parkway Future alternative would cost between $44 and 49 million.
- Concept 6 (Madison Overpass) – This alternative allowed for an additional thru-lane along Whitton Expressway at Madison, Monroe and Jefferson that , as noted in Chapter 3, helped to address issues of capacity and traffic operations. Traffic traveling from north to south through this area of Jefferson City could utilize an overpass of Whitton Expressway at Madison Street, eliminating the at-grade intersection. Traffic could also travel along Jefferson and Monroe streets which will continue to have at-grade intersections with Whitton Expressway. The cost of constructing this alternative is estimated at $14 to 17 million.

Eastern Segment – Prison Access Alternatives

The study team selected to advance three prison access initial alternative concepts as reasonable alternatives.

- Concept A (Lafayette) – This alternative satisfied the purpose and need as it provided the most direct access to the prison redevelopment site. It also provided direct access to Lincoln University located immediately south of Whitton Expressway. The interchange at Lafayette Street would affect several potentially eligible historic properties and Quinn Chapel. This initial alternative would require four lanes so there would also be property impacts along Lafayette Street beyond the interchange, including but not limited to eliminating on-street parking and some driveway access. The cost of constructing this alternative is estimated at $22 to 26 million.
- Concept D (Lafayette Half Interchange and Clark Realignment) – This concept advanced as a reasonable alternative because of its potential to build on the benefits of Concepts A and C. The Lafayette Interchange would provide access on Lafayette Street to the prison site with some of the impacts of the full interchange, but property needs would not be as extensive as this concept allows the footprint of Lafayette Street north of Miller to remain the same as it is today. The realignment of Clark Avenue would require Clark Avenue to go northwest of the existing roadway. This concept would provide for the flexibility to phase the improvements to take place as traffic warrants. The cost of constructing this alternative is estimated at $21 to 24 million.
- Alternative G (Lafayette Full Interchange and Clark Realignment) – Based on community input during the process of analyzing the reasonable alternatives, the study

team chose to add a fourth prison access alternative. This alternative includes a slight permutation of Alternative D. The difference between the two is that Alternative G would construct a full diamond interchange at Lafayette, instead of the half-diamond interchange. Access from Clark Avenue would remain the same. The cost of constructing this alternative is estimated at $23 to 26 million.

How will the reasonable alternatives be evaluated?

Based on each concept's ability to meet purpose and need and other key criteria, the study team chose three mainline and three prison access concepts for further development as alternatives. The study team screened alternatives based on a thorough assessment of their impacts to the natural, cultural and social environment. That detailed assessment has been detailed and documented in **Chapter 3** of this document.

Following the conclusion of that analysis, including input received from the public and local, state and federal resource agencies, a final Preferred Alternative has been identified. That selection process has been document in **Chapter 5.**